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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/527,269

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Yasuaki Nakano

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OLIFF & BERRIDGE, PLC

P.O. BOX 320850

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EXAMINER

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3748

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/527,269	Applicant(s) NAKANO ET AL.	
	Examiner DIEM TRAN	Art Unit 3748	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 November 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,4-6,10-15 and 38-41 is/are pending in the application.
- 4a) Of the above claim(s) 3 and 16-37 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-6,10-15 and 38-41 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This office action is in response to the amendment filed on 11/5/08. In the amendment, claims 1, 2, 4, 10-11, 14, 38-40 have been amended, claims 3, 16-37 have been withdrawn, claims 7-9 have been canceled and claim 41 has been added. Overall, claims 1, 2, 4-6, 10-15, 38-41 are pending in this application.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2, 4, 10-14, 38, 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kihara et al. (US Patent 5,577,382) in view of Uchida (US Patent 6,755,013).

Regarding claims 1, 2, 4, 41, Kihara discloses an exhaust purification device for an internal combustion engine designed to purify NO_x generated when burning fuel under a lean air-fuel ratio by an exhaust purification catalyst arranged in an exhaust passage, said exhaust purification device using as a catalyst carrier of said exhaust purification catalyst a carrier having base points on the carrier surface, carrying a precious metal catalyst dispersed on the carrier surface without forming a layer of a NO_x absorbent able to absorb NO_x, and temporarily switching the air-fuel ratio of the exhaust gas flowing into the exhaust purification catalyst from lean to rich before the entire surface of the precious metal catalyst suffers from oxygen poisoning, calculating an amount of oxygen poisoning of the precious metal catalyst based on an

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oxygen concentration in the exhaust gas (see Figures 1, 5A, 5B, col. 5, lines 1-4, 35-42, col. 13, lines 34-51); however, fails to disclose calculating an amount of oxygen poisoning of the precious metal catalyst based on a temperature of the catalyst. Uchida teaches that an oxygen storage amount of a catalyst is depended on a catalyst temperature (see Figure 11, col. 1, lines 42-54).

It would have been obvious to one having ordinary skill in the art at the time the invention was made, to have utilized the teaching of Uchida in the Kihara system, since the use thereof would have been conventional in the art to accurately determine the amount of oxygen stored in the catalyst.

Regarding claims 10, Kihara further discloses calculating an amount of oxygen poisoning of the precious metal catalyst and wherein the air-fuel ratio of the exhaust gas is switched from lean to rich when the calculated amount of oxygen poisoning exceeds a predetermined allowable value (see col. 13, lines 35+, col. 14, lines 1+).

Regarding claim 11, Kihara further discloses that an air-fuel ratio sensor (22) is used for detecting an air-fuel ratio of the exhaust gas flowing out from the exhaust purification catalyst and wherein it is judged that oxygen poisoning of the precious metal catalyst has been eliminated, when the air-fuel ratio of the exhaust gas flowing out from the exhaust purification catalyst becomes rich after the air-fuel ratio of the exhaust gas flowing into the exhaust purification catalyst is switched from lean to rich (see Figure 17, col. 13, lines 34-50).

Regarding claim 12, Kihara further discloses that the NO_x and SO_x contained in the exhaust gas are oxidized by the precious metal catalyst in the exhaust purification catalyst, then held on the catalyst carrier (see col. 7, lines 45-62).

Regarding claim 13, Kihara further discloses that the NO_x held on the catalyst carrier is released from the catalyst carrier and reduced when the air-fuel ratio of the exhaust gas flowing into the exhaust purification catalyst is temporarily switched from lean to rich to eliminate the oxygen poisoning of the precious metal catalyst (see col. 6, lines 1-21).

Regarding claim 14, Kihara further discloses that the strength of the basicity of the surface of the catalyst carrier is set to a strength by which the SO_x is held on the surface of the catalyst carrier in the form of sulfate ions (see col. 7, lines 45-62).

Regarding claim 38, the modified Kihara system discloses all the claimed limitations as discussed in claim 1 above, however, fails to disclose that a reducing agent is fed into the engine exhaust passage to make the air-fuel ratio of the exhaust gas rich.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to inject a reducing agent into an engine exhaust passage in Kihara, since the examiner takes Official Notice of the equivalence of “injecting fuel into a cylinder” and “injecting fuel into an exhaust passage” to form a rich gas stream for their use in the exhaust gas treatment art, and the selection of any of these known equivalents would be within the level of ordinary skill in the art.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kihara et al. (US Patent 5,577,382) and Uchida as applied to claim 1 above, and further in view of Yamashita et al. (US Patent 6,148,612).

The modified Kihara system discloses all the claimed limitations as discussed in claim 1 above, however, fails to disclose that the ratio of a rich time to a lean time at this time is set to a

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ratio giving a NOx purification rate of 90 % or more when the temperature of the exhaust purification catalyst is 200°C to 250°C. Yamashita teaches that a ratio of a rich time to a lean time at this time is set to a ratio giving a NOx purification rate of 90 % or more when the exhaust purification catalyst is activated (see col. 5, lines 56-67, col. 6, lines 1-11).

It would have been obvious to one having ordinary skill in the art at the time the invention was made, to have utilized the teachings of Yamashita in the modified Kihara system, since the use thereof would have been conventional in the art to maintain the NOx purification rate at a predetermined level.

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kihara et al. (US Patent 5,577,382) and Uchida as applied to claim 1 above, and further in view of Nishikawa et al. (US Patent 5,315,823).

The modified Kihara system discloses all the claimed limitations as discussed in claim 1 above, however, fails to disclose that the action of switching the air-fuel ratio from lean to rich is prohibited when the temperature of the exhaust purification catalyst is an allowable temperature or more. Nishikawa teaches the action of switching the air-fuel ratio from lean to rich is allowed when the temperature of the exhaust purification catalyst is less than allowable temperature (see col. 3, lines 30-34, col. 4, lines 26-31)

It would have been obvious to one having ordinary skill in the art at the time the invention was made, to have utilized the teachings of Nishikawa in the modified Kihara system, since the use thereof would have increased the efficiency of the NOx purification catalyst.

Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kihara et al. (US Patent 5,577,382) and Uchida as applied to claim 14 above, and further in view of Miyoshi et al. (US Patent 6,562,753).

The modified Kihara system discloses all the claimed limitations as discussed in claim 14 above, Kihara further discloses that when getting the SO_x held on the surface of the catalyst carrier released from the surface of the catalyst carrier, then the air-fuel ratio of the exhaust gas is made rich (see col. 7, lines 63-67, col. 10, lines 53-62); however, fails to disclose that the temperature of the exhaust purification catalyst is made to rise to the SO_x release temperature and the SO_x release temperature is about 500°C to 550°C. Miyoshi teaches increasing the exhaust temperature to a SO_x release temperature and the SO_x release temperature is about 500°C to 550°C (see col. 7, lines 62-67, col. 10, lines 50-65).

It would have been obvious to one having ordinary skill in the art at the time the invention was made, to have utilized the teachings of Miyoshi in the modified Kihara system, since the use thereof would have been conventional in the art to regenerate the exhaust purification catalyst.

Claims 39, 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kihara et al. (US Patent 5,577,382) and Uchida as applied to claim 1 above, and further in view of Yoshizaki et al. (US Patent 6,634,345).

Regarding claim 39, the modified Kihara system discloses all the claimed limitations as discussed in claim 1 above, however, fails to disclose gradually increasing in amount of generation of soot and reaching a peak when increasing the amount of exhaust gas recirculation

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and no longer generating almost any soot when further increasing the amount of exhaust gas recirculation and wherein the air-fuel ratio of the exhaust gas is made rich where the amount of exhaust gas recirculation being increased over the amount where the amount of generation of soot peaks. Yoshizaki teaches increasing gradually in amount of generation of soot and reaches a peak when increasing the amount of exhaust gas recirculation and no longer generates almost any soot when further increasing the amount of exhaust gas recirculation and wherein the air-fuel ratio of the exhaust gas is made rich where the amount of exhaust gas recirculation being increased over the amount where the amount of generation of soot peaks (see col. 2, lines 40-51).

It would have been obvious to one having ordinary skill in the art at the time the invention was made, to have utilized the teachings of Yoshizaki in the modified Kihara system, since the use thereof would have suppressed the reduction in the exhaust gas temperature.

Regarding claim 40, Yoshizaki further teaches gradually increasing in amount of generation of soot and reaches a peak when increasing the amount of exhaust gas recirculation and no longer generates almost any soot when further increasing the amount of exhaust gas recirculation and wherein the amount of exhaust gas recirculation is increased over the amount where the amount of generation of soot peaks when the temperature of the exhaust purification catalyst should be raised (see col. 2, lines 40-64).

Response to Arguments

Applicant's arguments filed on 11/5/08 have been fully considered but they are moot in view of a new ground(s) of rejection.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Conclusion

Any inquiry concerning this communication from the examiner should be directed to Examiner Diem Tran whose telephone number is (571) 272-4866. The examiner can normally be reached on Monday -Friday from 8:00 a.m.- 6:00p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas E. Denion, can be reached on (571) 272-4859. The fax number for this group is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for

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unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 800-786-9199 (toll-free).

/Diem Tran/
Patent Examiner

/Thomas E. Denion/
Supervisory Patent Examiner, Art Unit 3748